



Integrated
Environmental
Solutions

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Mr. Anthony Cinque
Case Manager
New Jersey Department of Environmental Protection (NJDEP)
Bureau of Federal Case Management
Division of Responsible Site Party Remediation
CN028
Trenton, NJ 08625

Subject: L.E. CARPENTER & COMPANY, WHARTON, NEW JERSEY, NJD002168748
Response to NJDEP & USEPA Comments dated July 26, 2002

Dear Mr. Cinque:

This response addresses review comments provided by both the United States Environmental Protection Agency (USEPA) and the New Jersey Department of Environmental Protection (NJDEP) dated July 26, 2002 on reports prepared by RMT, Inc. (RMT) on behalf of L.E. Carpenter & Company (LEC) entitled *Findings and Recommendations Regarding a Conceptual Free-Product Remediation Strategy* (dated March 14, 2002) and *Nature and Extent of Lead in Soils and Groundwater* (dated March 14, 2002). The responses presented in this document also incorporate the discussions held between LEC, RMT, NJDEP and USEPA at the meeting on September 19, 2002 at the USEPA Edison Laboratories facility, located in Edison, New Jersey.

The September 19, 2002 project meeting with LEC, RMT, NJDEP, and USEPA at the USEPA Edison Laboratories facility was conducted to 1) verify approval of a Conceptual Free-Product Remedial approach, 2) verify approval to move forward with a Focused Feasibility Study (FFS) on lead contaminated soils to support a change in the ROD, 3) integrate a selected alternative on lead soil with the Free-Product Remedial Action Plan (RAP), and 4) resolve issues related to agency comments on the Lead and Free-Product Reports via face to face discussions.

I. SUMMARY OF CRITICAL ISSUES

This section presents a summary of critical issues associated with both the lead and free product remedial approach. These issues were addressed within the regulatory comment letter dated July 26, 2002, discussed at the meeting on September 19, 2002, and are addressed within the individual responses contained within this document. These critical issues and LEC's approach to addressing each issue are outlined below.

- NJDEP, in its July 26, 2002 letter, stated that NJDEP/USEPA concurred with the findings and recommendations in the Free Product Remedial Strategy Report, and that the delineation of lead contamination in soils above 600 parts per million (ppm) has been adequately defined in the Nature and Extent of Lead in Soils and Groundwater Report. In addition, NJDEP/USEPA stated in the July 26, 2002 letter that the information contained in the Nature and Extent of Lead in Soils and Groundwater Report presented a defensible remediation cleanup goal for remediating lead



contamination above 600 ppm from a human health perspective for an industrial/ commercial, non-residential scenario, as outlined in the ROD and that it appeared that the extent and nature of lead at the site had been adequately determined in the Report.

- Since the future use of the site is now projected to be a combination of mixed municipal use, possibly involving a new municipal building, roadway, and attendant parking lot and park, LEC will perform a Focused Feasibility Study (FFS) to address the projected new future use for the site and the current remediation approach. The FFS will propose altering the existing 1994 Record of Decision (ROD) remedy for on-site soils impacted with lead contamination greater than 600 ppm from excavation and off-site disposal to excavation and subgrade reuse as fill material. LEC previously submitted a Rockaway River Sediment Ecological Assessment Report to NJDEP and EPA containing field sampling results and concluded that the conditions of the site are not impacting the biological community in the sediments or water environments of the Rockaway River. In a February 3, 1993 letter, NJDEP stated that it found that ecological conclusion acceptable. A "full blown" ecological risk assessment will therefore not be incorporated into the FFS, however; ecological and human health risk, and natural resource issues associated with reuse of lead soils as subgrade fill material, given the projected mixed municipal end use, will be addressed in the FFS.
- Washing the excavated coarse material fraction greater than 3-inches in diameter (*i.e.*, cobbles and boulders) during the proposed remedial approach outlined in the report entitled *Findings and Recommendations Regarding a Conceptual Free-Product Remediation Strategy* (dated March 14, 2002) will not be required by either the NJDEP and USEPA prior to subgrade reuse.
- An FFS relating to removal of free product and product-saturated soils as outlined in the report entitled *Findings and Recommendations Regarding a Conceptual Free-Product Remediation Strategy* (dated March 14, 2002) will not be required by either the NJDEP or the USEPA as implementation of this approach does not require a change in the existing 1994 ROD.
- Any ecological and human health risks, and natural resource issues associated with construction activities and post remedial end use conditions will be addressed in the FFS and the RAP. The RAP will be prepared and submitted once NJDEP and USEPA approve the FFS.
- Complete dewatering during the wet-excavation portion of the remediation is not considered feasible due to difficulties and costs associated with producing and disposing of the large volumes of groundwater anticipated if continuous pumping is attempted. As we discussed at our September 19 meeting, limited volumes of groundwater will be removed from the free product excavation as a result of free product recovery efforts (absorption, skimming, etc.). As outlined in the *Findings and Recommendations Regarding a Conceptual Free-Product Remediation Strategy* (dated March 14, 2002), RMT intends on performing a certain portion of the free product excavation below the lowest-recorded groundwater elevation (estimated to be no more than two feet below the water table) to recover as much of the free product smear zone soils as possible.
- ROD modification regarding an alternate approach to dissolved phase impacted groundwater (*i.e.*, Monitored Natural Attenuation or MNA) will be addressed in an FFS proposed for submittal

following performance of both the free product and lead soils remedial actions, and after LEC has implemented the approved MNA workplan dated May 2001.

II. RESPONSES TO SPECIFIC COMMENTS (NJDEP) - NATURE AND EXTENT OF LEAD IN SOILS AND GROUNDWATER

1. Response to Comment No. 1, regarding hot spot soil disposition:

RMT assumes that those soils historically excavated from Hotspots B, C, and D were stockpiled adjacent to the former Building 14. Our assumption is based on the following information:

- Past discussions held with NJDEP and LEC.
- The Building 14 area is generally higher in elevation than the surrounding terrain and is topographically irregular with some discrete piles of mining and forge-era fill material. This can be observed visually on Figure 2 from the report entitled *Quarterly Monitoring Report - 2nd Quarter 2002* (RMT, August 2002), which incorporates the results of aerial photography and topographic mapping completed earlier this year. Because the building demolition and Hot-Spot excavations were all performed at about the same period of time (1995-1996), this is further evidence that the excavated soils were stockpiled within the former Building 14 footprint.
- In the NJDEP letter dated February 28, 1995, the Department restated their ruling that the soils excavated from inorganic hot spots A, B, C, & D were non-hazardous and not subject to land ban restrictions. Subsequently, this volume of soil, although much larger than originally delineated in the remedial investigations (RI), was not authorized for use as backfill in the waste disposal area excavation. This issue was again revisited by LEC, and the NJDEP re-stated their stance regarding on-site reuse of this material in the NJDEP letter dated August 9, 1995. Excavation(s) of Hot Spots B and C continued throughout 2nd quarter 1996, and were documented in the *Second Quarter Progress Report* (Roy F. Weston [WESTON], August 1996). However, as 1) documentation regarding off-site disposal (bills of lading, manifests, etc.) have not been located, 2) on-site reuse of this material in the waste disposal area was not approved by the NJDEP, and 3) at the end of 2nd Quarter 1996 a "clean zone" for lead soils with concentrations greater than 600 ppm was not established, RMT is of the opinion that the soils remain staged on-site in close proximity to the original locations of the Hot Spot B and C excavations.
- Dark-colored soils consisting of glassy slag, pig iron, rust-colored silt-sized particles, iron-ore (primarily magnetite) and native sand/gravel particles underlie the elevated area over Former Building 14. The iron-rich material was predominantly derived from historic iron mining/forging activities (dating from the late 1700's through 1800's) as discussed in our recent lead-delineation report. This is the same type of material reported by WESTON to have been excavated from the initially defined Hot Spot areas, which suggests that the excavated soils were stockpiled over the former Building 14 footprint. In addition, elevated levels of lead in these mining wastes suggest that they were placed there from excavation of Hot Spots B, C, and D.

- RMT verified by means of trenching that the former Building 14 was constructed within the mine tailing wastes as shown on Figure 3 of our report. There is a strong visual association between elevated lead and mine tailing/iron forge wastes. This association was shown to be coincidental following the isotopic and electron microscopy work recently completed and reported in our delineation report.

2. Response to NJDEP Comment No. 2 Regarding ecological risk assessments:

The *Rockaway River Sediment Ecological Assessment Report* (WESTON, December 7, 1992) concluded that historical on-site operations and current site conditions are not impacting the biological community in the sediment or water environments of the Rockaway River. In a letter dated February 3, 1993, the NJDEP stated that the Department and the USEPA find the conclusion derived in the Ecological Assessment acceptable.

However, as discussed at the September 19, 2002 meeting, ecological and human health risk, and natural resource issues associated with reuse of lead soils as subgrade fill material, given the projected mixed municipal end use of the property, will be addressed in the FFS.

3. Response to NJDEP Comment No. 3 regarding Lateral extent of lead:

The sampling point designated as GPC-15A was correctly identified with an RMT 2001 test pit symbol. In their letter dated December 21, 2000, NJDEP requested that LEC investigate further high levels of lead previously found in boring GPC-15, a sample location presented in the report entitled *Hot Spot B and Hot Spot C Subsurface Lead Investigation* (RMT, August 1999). Therefore, RMT designated a test-trench as GPC-15A to further investigate the high levels of lead found at the 1999 GPC-15 boring. Please note that the analytical results listed in Table 1 of the *Nature and Extent of Lead in Soils and Groundwater* (dated March 14, 2002) *should have been labeled GPC-15A, specific to the 2001 lead investigation sample location.*

Vertical locations of former Weston test pit and boring samples may have inaccuracies due to post-investigation site disturbance. Specifically, some of the original pre-excavation samples may now be buried by fill-soils that were stockpiled over older sampling points. Nevertheless, regardless of whether the original data is now inaccurate in terms of the depth distribution, it is still useful in correlating with more recent data to define the "foot print" of potential impact from operations in the vicinity of Building 14. The distribution trends and clustering of lead concentrations around the building support the general use of the data without the need for additional qualifiers.

4. Response to NJDEP Comment No. 4 regarding the process waste seam:

The intended purpose and distribution of the lead investigation test pits was to focus on specific causes of elevated lead and its distribution (lateral and vertical extent). Delineation of visually striking process waste material we encountered (Ref. SS-17 pictures) was done only qualitatively on the basis of pre-planned test trenches and the physical outline of the former AST area (based on existing concrete pads). Upon discovery, the small amount of process waste that had been excavated

was placed into a drum (less than ¼ of the drum was filled), and sampled. The trench was backfilled as outlined in the workplan. Post excavation samples were not taken because this was an investigation not a remedial action. The horizontal extent and approximate volume of this process waste is outlined in the conceptual free product remedial strategy report (Ref. Category B soils identified in Figures 11 and 12, and Table 8). The final plans and specifications for remediating the free product and lead-impacted soils will address delineation of the minimal volumes of visually obvious process wastes, potential contingencies associated with managing unforeseen conditions (*i.e.*, unanticipated larger volumes of process wastes), verification sampling of adjacent soils, and off-site disposal of these materials.

5. Response to NJDEP Comment No. 5 Regarding lead clean-up criteria:

We assume NJDEP used a different model for defining adult worker exposure and developing a clean-up standard of 600-mg/Kg lead for industrial/commercial land uses. However, as referenced in our report, the 902 mg/Kg was calculated as a risk-based remediation goal (RBRG) using the agreed-upon USEPA risk assessment model (please note the references used in the report). LEC anticipates remediating all soils above the 600 mg/Kg level. As stated above, the previous ecological assessment showed that current site conditions are not impacting the biological community in the sediment or water environments of the Rockaway River. Therefore, remediating those exposed soils with total lead concentrations in excess of 600 mg/Kg, can only serve to provide a greater confidence that there will be no ecological impacts once we have implemented this remedial action.

6. Response to NJDEP Comment No. 6 regarding wetlands analyses and delineation:

This information will be discussed and presented visually in the Focused Feasibility Study (FFS) for lead impacted soils and in the design and specification package presented as part of the final RAP.

III. RESPONSES TO SPECIFIC COMMENTS (USEPA) - NATURE AND EXTENT OF LEAD IN SOILS AND GROUNDWATER

1. Response to USEPA Comment No. 1 Regarding site geochemistry and leaching tests:

SPLP tests were conducted as the USEPA recommended method to conservatively simulate potential leaching of contaminants under a broad variety of conditions that might occur on this site. The lack of identified metals contamination (including lead) migrating from this site, as evidenced by historical (long-term) groundwater monitoring results and Section 3.8 of this report, supports the conclusions reached from this USEPA-approved method that leaching of lead from on-site materials which are not identified as a process waste is unlikely. On site materials, which are identified as process, waste will be appropriately disposed off site.

In May 2000, RMT submitted a report titled "Evaluation of Remediation of Groundwater by Natural Attenuation" (Evaluation) that presented detailed geochemical information for the LEC Site. The evaluation showed redox conditions change depending upon location with reducing conditions

(anaerobic) in the plume area groundwater and oxidizing conditions (aerobic) around the periphery that extends radially outside the plume area. Within the natural attenuation evaluation, RMT concluded that contaminants of concern are degrading aerobically on the plume's periphery based upon data such as contaminant concentrations, dissolved oxygen absent within the plume and present outside the plume, oxidation/reduction potential, etc. DEHP, xylenes and ethyl benzene (all non-chlorinated solvents) are aggressively degraded under aerobic conditions on the plume's periphery as shown by monitoring well data. Xylenes and ethyl benzene are also degraded anaerobically, but at a much slower rate. Based upon groundwater monitoring, the plume appears to be stable with both anaerobic and aerobic conditions depending upon location.

The migration of lead from soil to groundwater in this area is a concern highlighted in the NJDEP response letter due to the variety of conditions at the site, and in particular, as this potential migration relates to the varying groundwater redox conditions at the site. Groundwater monitoring at locations in and around the plume show that the migration of lead in groundwater is not problematic. Geochemical information such as site pH, Eh, iron speciation data, etc. presented in the natural attenuation evaluation did not suggest any conditions conducive to migration of the lead. Lead exists in only one valence state under ambient conditions (+2), and, therefore, oxidation/reduction conditions would not change the valence state of lead. The solubility of lead in the +2 state is primarily pH dependent, and lead is essentially insoluble in the groundwater at the site because the pH is within the neutral pH range (6 to 8), regardless of location or change in redox conditions. RMT conducted SPLP tests using contaminated site soil to conservatively estimate potential leaching of lead from soil to groundwater. The lack of metals contamination (including lead) migrating from the site, as evidenced by historical (long term) groundwater monitoring results and Section 3.8 of the March 2002 report, supports the conclusions reached from the SPLP test, the USEPA-approved method, that leaching of lead from on-site materials will not be measurable given current geochemical conditions of the groundwater. The available geochemical data supporting this view will be summarized in the FFS.

2. Response to USEPA Comment No. 2 regarding groundwater elevations:

Groundwater contour maps have been provided on a quarterly basis since Administrative Consent Order (ACO) was signed in 1986, exhibiting that the water table conditions on site are generally well understood. Given that the upper aquifer is highly conductive, that the groundwater gradient is low, and that the proposed remediation outlined in the free-product report will involve placement of lead contaminated soils above the seasonal high water table; it is unclear what benefit would be derived from more detailed analysis of groundwater flow conditions or from where that data would come.

One soil sample was encountered at a depth of 8 feet at GPC-15A that had elevated lead concentrations just at 600 PPM. From the volume of sampling conducted this appears to be an isolated occurrence. Not surprisingly it occurs in the limited area in which high levels of process waste have been encountered. Also note the presence of a concrete pad in this area at a depth of 10 feet that would indicate disturbance of soils to at least this depth. It is our intent that Category B soils

as shown in this area on Figure 12 of the Free-product Report will be fully excavated and disposed of off-site during the remedial action. It is also intended that the RAP will include a description of the location and frequency of confirmatory XRF sampling that will be conducted in the area to be sure that soils with lead concentrations higher than the cleanup criterion are removed from the excavated area. This criterion will be based on the final human risk assessment to be presented in the FFS. So far there is no evidence that material with elevated lead levels extends below the water table during average water table conditions. The temporary groundwater mounding east of this area appears to be the result of slow draining of lower permeability soils as well as recharge from collected surface water runoff in the area of an apparent seepage basin to the east of the tank pad.

3. Response to USEPA NO. 3 Regarding the lead clean-up goal:

Again, the Rockaway River Sediment Ecological Assessment Report dated December 7, 1992 concluded that historical on-site operations and current site conditions are not impacting the biological community in the sediment or water environments of the Rockaway River. In a letter dated February 3, 1993, the NJDEP stated that the Department and the EPA find the conclusion derived in the Ecological Assessment acceptable.

However, as discussed at the September 19, 2002 meeting, ecological and human health risk, and natural resource issues associated with reuse of lead soils as subgrade fill material, given the projected mixed municipal end use of the property, will be addressed in the FFS.

4. Response to USEPA NO. 4 regarding ecological risks:

Again, the Rockaway River Sediment Ecological Assessment Report dated December 7, 1992 concluded that historical on-site operations and current site conditions are not impacting the biological community in the sediment or water environments of the Rockaway River. In a letter dated February 3, 1993, the NJDEP stated that the Department and the EPA find the conclusion derived in the Ecological Assessment acceptable.

However, as discussed at the September 19, 2002 meeting, ecological and human health risk, and natural resource issues associated with reuse of lead soils as subgrade fill material, given the projected mixed municipal end use of the property, will be addressed in the FFS.

5. Response to USEPA Comment No. 5 regarding cadmium and other metals:

Previous investigations reported to USEPA by RMT and WESTON on the L.E. Carpenter site did not identify cadmium as a metal of concern in soils or groundwater. Coupled with past data, the current data suggest that this is an isolated occurrence specific only to process material discovered onsite during the investigation and is not a site wide contaminant. As cadmium is associated with this process material, and all process material identified during excavation activities is proposed for removal and disposal off-site, it appears unlikely that cadmium would pose a risk given the proposed remedial concept and site end use. Existing data will be summarized in the FFS, and as discussed

above, verification samples of the soils surrounding process wastes will be collected following their removal.

6. Response to USEPA Comment No. 6 regarding TCLP results:

We agree that a summary table of TCLP results might be helpful. The focus of the overall report, however, is on the extent of the lead. Elevated cadmium and chromium levels and correspondingly higher TCLP values were found only in material from visually identifiable waste pockets. As discussed above, historical data shows that the only metal of concern at the LEC site is lead, and these data will be summarized in the FFS. The process waste materials will have to be tested further prior to intended off-site disposal. Any TCLP or similar testing performed during the remediation will be tabulated and presented in the remedial construction documentation report. Template analytical tables outlining associated sampling methods, duration, frequency, location and rationale will be presented in the RAP prior to implementation.

7. Response to USEPA Comment No. 7 regarding SPLP results:

In as much as the zone of copper contamination is visually identifiable and will be removed, further analyses of this process waste other than for disposal characterization do not appear warranted. However, as discussed above, historical data shows that the only metal of concern at the LEC site is lead, and these data as well as the TCLP data will be summarized in the FFS. In addition, target cleanup goals will be discussed in the FFS for those metals detected in the TCLP testing in order to determine whether verification samples are indicative of adequate waste removal.

8. Response to USEPA Comment No. 8 regarding field parameters:

Collection of field parameters is to assure stabilization of water conditions prior to sampling. As this information satisfies no higher level of data quality objective, further tabulation and presentation in the report would not be beneficial. However, field data collected from future groundwater monitoring events will be presented in the FFS as attached field notes and logs and will be summarized in table format to facilitate an expedited report review.

9. Response to USEPA Comment No. 9 regarding well WP-A2:

The well cap and head are broken, and we have capped the top to act as a temporary seal. This well, along with several others, will be properly abandoned during remediation. All wells proposed for abandonment prior to excavation initiation will be appropriately identified in the RAP. In addition, once on-site remedial activities are complete, additional monitoring wells (if applicable) will be proposed for installation to continue site groundwater monitoring to support an eventual ESD regarding the implementation of Monitored Natural Attenuation (MNA) as the accepted remedial option for shallow groundwater impacted with dissolved phase constituents.

10. Response to USEPA Comment No. 10 Regarding SS-47:

See response No. IV (7). The sample was analyzed for 11 RCRA metals (totals and TCLP) because of its nature as a waste material that would have to be excavated and disposed off site. The report states

that this material was visually identified as a green material and its limits were defined by physical exposure during test pit excavation.

11. Response to USEPA Comment No. 11 Regarding WDA-PES-6:

It is intended that the former Waste Disposal Area in which WDA-PES-6 is located will be excavated as part of the free-product remediation effort. As shown on Figure 10 of the *Findings and Recommendations Regarding a Conceptual Free-Product Remediation Strategy* (RMT, March 14, 2002) this area falls within the limits of excavation.

12. Response to USEPA Comment No. 12 regarding isotope ratios:

The lead investigation was performed to delineate the lateral and vertical extent of lead impacted soils exhibiting a concentration greater than 600 ppm, and to determine the "nature" of the lead contamination existing on-site. As described in our report, the isotope data simply supports a different source and type of lead in the process waste versus the microscopic and finely disseminated lead particles present within the mine/forgewaste fill material. The investigations clearly showed that elevated lead concentrations within the mine/forgewaste fill material in the vicinity of Building 14 are related to former manufacturing processes in that building and not other sources such as historical mining activities.

13. Response to USEPA Comment No. 13 regarding ecological risk assessment:

The *Rockaway River Sediment Ecological Assessment Report* (WESTON, December 7, 1992) concluded that historical on-site operations and current site conditions are not impacting the biological community in the sediment or water environments of the Rockaway River. In a letter dated February 3, 1993, the NJDEP stated that the Department and the USEPA find the conclusion derived in the Ecological Assessment acceptable.

However, as discussed at the September 19, 2002 meeting, ecological and human health risk, and natural resource issues associated with reuse of lead soils as subgrade fill material, given the projected mixed municipal end use of the property, will be addressed in the FFS.

14. Response to USEPA Comment No. 14 regarding XRF calibration:

The report cited lead standards of 5,600, 1,150 and <20 ppm for the high-, medium- and low-concentrations respectively for calibration of the XL-702s XRF. These values were approximated for reporting purposes and are based on the NIST standards provided with the instrument that are more precisely 5592 ± 80 ppm, 1162 ± 31 ppm, and 18.9 ± 0.5 ppm, respectively for lead.

15. Response to USEPA Comment No. 15 regarding test pit sampling:

After excavating to the maximum exploratory depth, the pit was backfilled to a safe depth at which the sampler could enter the excavation. The intermediate sample was obtained directly from the wall of the pit after cleaning the soil smear off of the wall surface. In this manner the sampler was able to select the strata for sampling. No mixed or composited materials were sampled.

16. Response to USEPA Comment No. 16 regarding bullets on Section 3.1:

It is clear that removal and off-site disposal of the process wastes discovered while performing the work agreed upon by NJDEP and USEPA will be required. Our task, agreed to by all parties during the October 25, 2001 conference call, was to determine an integrated approach to expedite cleanup of the LEC site. The statements made in the lead delineation report serve to support the conceptual approach presented in the free product remediation strategy report that was submitted simultaneously with the lead delineation report.

Given the intended end use for the property, exposure to some potential future construction worker would be limited to a very short time period. Regardless, both areas in question are part of the proposed excavation area for remediating the free product. In the case of the copper contaminated material, this area will be handled as a spot excavation; separate from the main area of excavation. The details of how we will approach unforeseen contaminants (such as those that may be encountered in the former waste disposal area) will be outlined in the RAP. For example, we may propose to screen soils from the general depth in question for total lead to ensure that any potential lead-soil concentrations above 600 ppm will be replaced within the excavation to an agreed upon depth below the ground surface. Any obvious process wastes will be removed and disposed of at an off-site facility. The site will likely be subjected to a deed restriction, so that any future property excavation work that may be undertaken will be performed only with the assistance of a competent environmental consultant.

Taking waste, whether it be clearly identifiable process waste or soils also exhibiting characteristically hazardous lead concentrations off site for disposal does not constitute a ROD change because hot spot soil excavation and off-site disposal was accepted as the approved remedy in the 1994 ROD. Subsequently, an evaluation of the nine criteria in a comprehensive feasibility study (FS) is not required, as no ROD Amendment is required.

17. Response to USEPA Comment No. 17 regarding cadmium:

See also our Response No. IV (5). It is believed that the high concentrations of heavy metals are contained within the visible process waste material. All high concentration soils (*i.e.*, process waste material identified as Category B materials) will be removed during remediation. Groundwater has neither in the past nor during recent monitoring currently shown elevated concentrations of cadmium from the site. These data will be summarized in the FFS. A description of verification sampling will be included in the final RAP.

18. Response to USEPA No. 18 regarding TCLP results:

See our Response No. IV (7 and 10) as this applies to any heavy metals detected in the process waste materials.

19. Response to USEPA Comment No. 19 regarding non-standard testing:

See our Response No. IV (12). Non-standard testing consisting of petrographic analysis and scanning electron microscopy was discussed in the report appendices.

20. Response to USEPA Comment No. 20 regarding ores:

Item No. 2 should have read "...galena or *other* metallic sulfides..."

Item No. 5 should have read "...Dover District of Morris County..."

21. Response to USEPA Comment No. 21 regarding crocoite:

We agree that the mineral is usually found as needles or prisms, and reiterate that it is "not spherical" as the report reads.

22. Response to USEPA Comment No. 22 regarding xylene:

Xylene is an organic solvent and is not anticipated to increase the solubility of the lead. The solubility of lead is most greatly affected by pH. Wastes that are contaminated with both lead and xylene are intended for removal and disposal from the site if encountered during the excavation.

23. Response to USEPA Comment No. 23 regarding site use:

The proposed future use of the site will be a mixed municipal use, and the Borough of Wharton, who would maintain the surface conveyances, would own the land. Currently a combination of tennis courts, bike paths, roller blade/ice skating area, and picnic areas are planned. The amount of potential human exposure for such a use is less than a scenario where an industrial or commercial worker is exposed to the land surface 8 hours per day, 5 days per week, 12 months per year. In addition, note that the data show most samples collected outside the area delineated for excavation and on-site burial of lead-impacted soils have soil-lead values lower than the generic state residential cleanup criterion for lead of 400 mg/Kg. Nevertheless, expected human risk (including exposure to children) that may remain from surficial soils following remediation of lead contaminated soils will be addressed in the FFS.

24. Response to USEPA Comment No. 24 regarding lead cleanup standards:

Comment is noted.

25. Response to USEPA Comment No. 25 regarding groundwater contaminant pathway:

The conclusion can be restated to include all RCRA metals, as long-term monitoring has not indicated the detection of any metals in groundwater above MCLs. The conclusion is not applicable to contamination of groundwater on site by BTEX or DEHP compounds. These are addressed in the free-product report.

26. Response to USEPA Comment No. 26 regarding wetlands on Figure 2:

This information will be discussed and presented visually in the Focused Feasibility Study (FFS) for lead impacted soils and in the design and specification package presented as part of the final RAP.

27. Response to USEPA Comment No. 27 regarding the former waste disposal area on Figure 2:

The dashed gold line "delineates the area of the Former Waste Disposal Area."

28. Response to USEPA Comment No. 28 regarding delineation of contaminated areas on Figure 2:

The interpretations on the drawing and in the report were that this is an isolated hot spot not connected to the main body of contamination around Building 14. These interpretations were made on the basis of professional judgement. Connection of the hot spot to the contaminated area around the Building would result in a narrow finger of contamination that has no sound basis or supportive evidence. We will address this issue in more detail by describing the proposed verification sampling program in the FFS.

29. Response to USEPA Comment No. 29 regarding intermediate sample depths:

See our Response No. IV (15).

30. Response to USEPA Comment No. 30 regarding the legend

The green color represents lead soil concentrations below 600 ppm.

**IV. RESPONSES TO SPECIFIC COMMENTS (NJDEP) – FINDINGS AND
RECOMMENDATIONS REGARDING A CONCEPTUAL FREE-PRODUCT
REMEDIAL STRATEGY**

1. Response to NJDEP Comment No. 1, para. 1 regarding free-product removal volumes:

Figures 7 and 9 present our interpretation of the "probable" extent of free-product in the subsurface based on an extraordinary number of empirical data points ranging from measured recovery well data to gross test-pit observations, as well as groundwater monitoring data. Based on these observations, Section 4.2 of the Report presents relative percentages of the total free-product in the soil zones as:

- Zone 1 - < 1 percent
- Zone 2 - ~ 5 percent
- Zone 3 - ~ 30 percent
- Zone 4 - ~ 60 to 70 percent

These zones correlate well with the free product distribution arrived at from numerical modeling as shown in Figure 8. As noted in Section 4.6 the proposed zone of excavation as delineated in Figure 10 encompasses Zones 3 and 4. Therefore about 95 percent or more of the free product would be removed. This degree of removal is significantly greater than the 10 to 20 percent removal that could be achieved by the current recovery system. In addition, RMT believes that that degree of removal is also much greater than other in-situ alternatives. The proposed remedial action is a robust one.

2. Response to NJDEP Comment No. 1, para 2 and USEPA Comment No. 1 regarding LTTD:

Prior to initiation of the investigation, LTTD had been the preferred ex-situ treatment option. Very early into the investigation, however, it was determined that there would be severe limitations for this technology. These included, but were not limited to:

- Material handling, storage and drainage capabilities of the coarse subsurface material
- Limitations on particle sizes going into the kiln
- Realization that much of the free product would be released and could be physically captured during excavation
- High moisture content of some of the material as the result of potential excavation below the water table.
- Concern that air permitting would meet local resistance
- Inability to effectively balance kiln feed rates and stockpiling needs, such that excavations would remain open too long.

While samples for bench-scale testing were obtained, a decision was made to put costly bench-scale testing on hold while other options were evaluated. Revelation that, given the anticipated waste characterization of the product-contaminated soil as non-hazardous, the simpler and more robust option of excavation and off-site dispose became more attractive. These issues were discussed with USEPA and NJDEP and became part of our need to have the waste characterization confirmed. Both NJDEP and USEPA were made aware that cost effective management of the anticipated waste streams outlined in Table 8 of the *Findings and Recommendations Regarding a Conceptual Free-Product Remediation Strategy* (RMT, March 14, 2002) were critical to the overall implementability of the proposed remedial approach.

3. Response to NJDEP Comment No. 2 regarding Groundwater and Surface Water Controls:

Sections 3.5.2, 3.6 and 3.8 all explicitly emphasize that given excavation dewatering (pumping) conditions, groundwater influx rates will be high and no practical controls can be implemented due to grain-size, flow volume and water management limitations. Thus, our conclusion in the report is that any excavation below the water table would have to be conducted "in-the-wet," as the excess water cannot be practically "dealt with." No conclusions were presented regarding surface-water controls, because the excavation will progress such that only a limited excavation area will be open at any one time, and because surface water will be prevented from entering the excavation (engineering controls). Excavation wall stability was observed and it was concluded (Section 3.4) that only the outside wall of the excavation area might need to be engineered during construction design. This will only require some sloping or step-backs in the saturated zone. These issues will be summarized and detailed in the final RAP.

4. Response to NJDEP Comment No. 3 regarding washing of the larger-sized fraction:

As noted in Section 3.3, the amount of residual product left on the surfaces of the larger particles is very low. Illustration A (attached) shows the relationship between particle diameter and surface area. The following computations illustrates just how small the residual product mass on the surface of the coarse fraction would be:

First, we assume 50 percent of the soil is greater than 2.5 inches in diameter, the particles are generally spherical and product coatings are of uniform thickness. Then, by dividing the entire soil distribution for the Type 1 soils (See Appendix E of the Free-Product Report) into quartiles by percent mass and extrapolating the median particle diameter for each quartile, we can arrive at the relative total surface areas that can be equated to percent product on soil surfaces (Illustration B). The resulting computations show that 99.83 percent of the product on particle surfaces will be removed with the < 2.5-inch soil fraction. The benefits of washing the larger fraction would be miniscule and not cost effective. ✓

5. Response to NJDEP Comment No. 4 regarding groundwater treatment:

The point and conclusions being emphasized in Sections 3.6, 3.7 and 3.8 are: (1) that excavation below the water table will encounter relatively fast groundwater influx; (2) that dewatering to dry conditions is not practical due to physical, regulatory and cost limitations; and (3) for any remedial action on the site to be practical and cost effective, handling and treatment of water must be minimized. This can only be accomplished by not having to completely remove the groundwater in the portion of the excavation below the water table; in other words by excavating in-the-wet. It should be noted that groundwater influx into the excavations would not exceed static groundwater levels and that as described in our report any free product sheens and backflow will be controlled with absorbent booms and skimmer pumps.

6. Response to NJDEP Comment No. 5 regarding product squeezing:

The explanation provided in Section 4.4 does not suggest "confinement" of immiscible product or discuss the lack of product in the ditch to the east of the source area. This Section shows: (1) that the geometry of the immiscible free product zone is a good match to the apparent product source; (2) that the axis of the oblong-shaped immiscible product zone is parallel to primary groundwater flow vector across the site; and (3) that the ovate geometry of the zone is likely influenced by the Rockaway River to the south of the source (which is a hydraulically "losing" stream in this area) and higher groundwater levels to the north of the source. The potentiometric maps presented in the quarterly reports show that the LNAPL product zone lies within a groundwater trough. Capillary forces in the soil matrix limit its extent downgradient. Also as noted on the September 19 meeting, Zone 1 soils shown in Figure 7 are interpreted to barely intercept the drainage ditch, and free-flowing product would only be anticipated in Zone 3 and 4 soils. Therefore, the presence of free product would not be anticipated in the drainage ditch.

7. Response to NJDEP Comment No. 6 regarding *in situ* thermal desorption:

All *in situ* thermal technologies were eliminated from further consideration because groundwater controls would have to be established to reduce the amount of heat required to reach the required temperatures.

8. Response to NJDEP Comment No. 6 regarding depth of excavation below water:

We concur. More detailed information regarding proposed excavation depth will be presented in the RAP.

9. Response to NJDEP Comment No. 7 regarding backfilling of lead-contaminated soils:

It is intended that backfilling with Category C Soils will be above the record high water table elevation.

10. Response to NJDEP Comment No. 8 regarding recovery of free product:

The proposed plan calls for removal of immiscible free-product from the excavation. This will be accomplished by the use of skimmers as well as absorbent booms that will prevent migration of the fluid into "clean zones." It is the intent that all free-product retained in the excavated soil or released to the excavation be captured and removed from the site. As noted in our Response No. V (1), we estimate that over 95 percent of the product in the soils beneath the site that is currently in contact with the groundwater will be removed by this action. Specific equipment to recover the product will be detailed in the RAP and design specifications.

V. RESPONSES TO SPECIFIC COMMENTS (USEPA) - FINDINGS AND RECOMMENDATIONS REGARDING A CONCEPTUAL FREE-PRODUCT REMEDIATION STRATEGY

1. Response to USEPA Comment No. 1 Regarding LTTD and alternatives analysis:

See our Response No. IV (2). The intent of this investigation was to fast track a robust remedial approach given the site conditions encountered.

2. Response to USEPA Comment No. 2 regarding cleaning of cobbles and boulders:

See our Response No. IV (4).

3. Response to USEPA Comment No. 3 regarding limits of excavation:

See our Response No. IV (1). The limits of the source zone and proposed excavation area were based on interpolation of an extraordinary amount of previous and current confirmatory subsurface investigative work. The zonations presented have no less a degree of certainty than interpolated groundwater contours. As the intent is to reduce the volume of immiscible free product, the best way to determine the limits of such free product prior to remedial action is through visual observation within excavated test pits, as was conducted. Only massive excavation, as will take place during

Mr. Anthony Cinque
New Jersey Department of Environmental Protection (NJDEP)
October 22, 2002
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remediation, will give a higher degree of confidence in the extent of the product. Use of the observational approach during remediation will assure that product removal is maximized.

4. Response to USEPA Comment No. 4 regarding cross-sectional presentations

As the purpose of the field investigation was to delineate the zone of free product to be remediated. Profile line A-A' (as presented on Figures 4, 5, 6) was purposely drawn to follow the primary axis of the free product zone. Figure 5 is intended to show the general site stratigraphy in terms of natural versus anthropogenic deposition. The investigative points shown along the axis of the profile are for reference purposes only to show what subsurface data points were utilized in the interpretation. Extrapolation of finer detail was not possible. As in interpretation of most sedimentologic environments the units have been stylized. The fill and debris units are too heterogeneous to warrant further definition.

Figure 6 was developed strictly to provide a general rather than detailed illustration of the upper and lower bound on the static water level at the site. Where possible, several years of monitoring records were used and the ranges were projected onto the line of cross-section. As excavation equipment can only operate effectively over larger areas, gross interpretation of the water table regime was only necessary. It should be noted that the upper and lower bounds show a fluctuation range of 4 to 5 feet, typical of unconsolidated deposits in the northeast.

If you have any questions regarding the contents of this letter, please contact any of the three individuals shown below at your convenience.

Sincerely,

RMT, Inc.



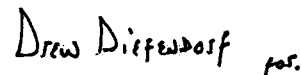
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Attachments: Illustration A - Particle Diameter and Surface Area Relationship Chart
Illustration B - Surface Area to Volume Calculation Sheet

cc: Gwen Zervas, NJDEP
✓ Stephen Cipot, USEPA
Cris Anderson, LEC
Lee Larson, LEC
John Scagnelli, Scarinci & Hollenbeck
Robert Kunze, Schoor DePalma

Illustration A
Particle Diameter and Surface Area Relationship Chart

Relation of Particle Diameter
to its Surface/Volume Ratio

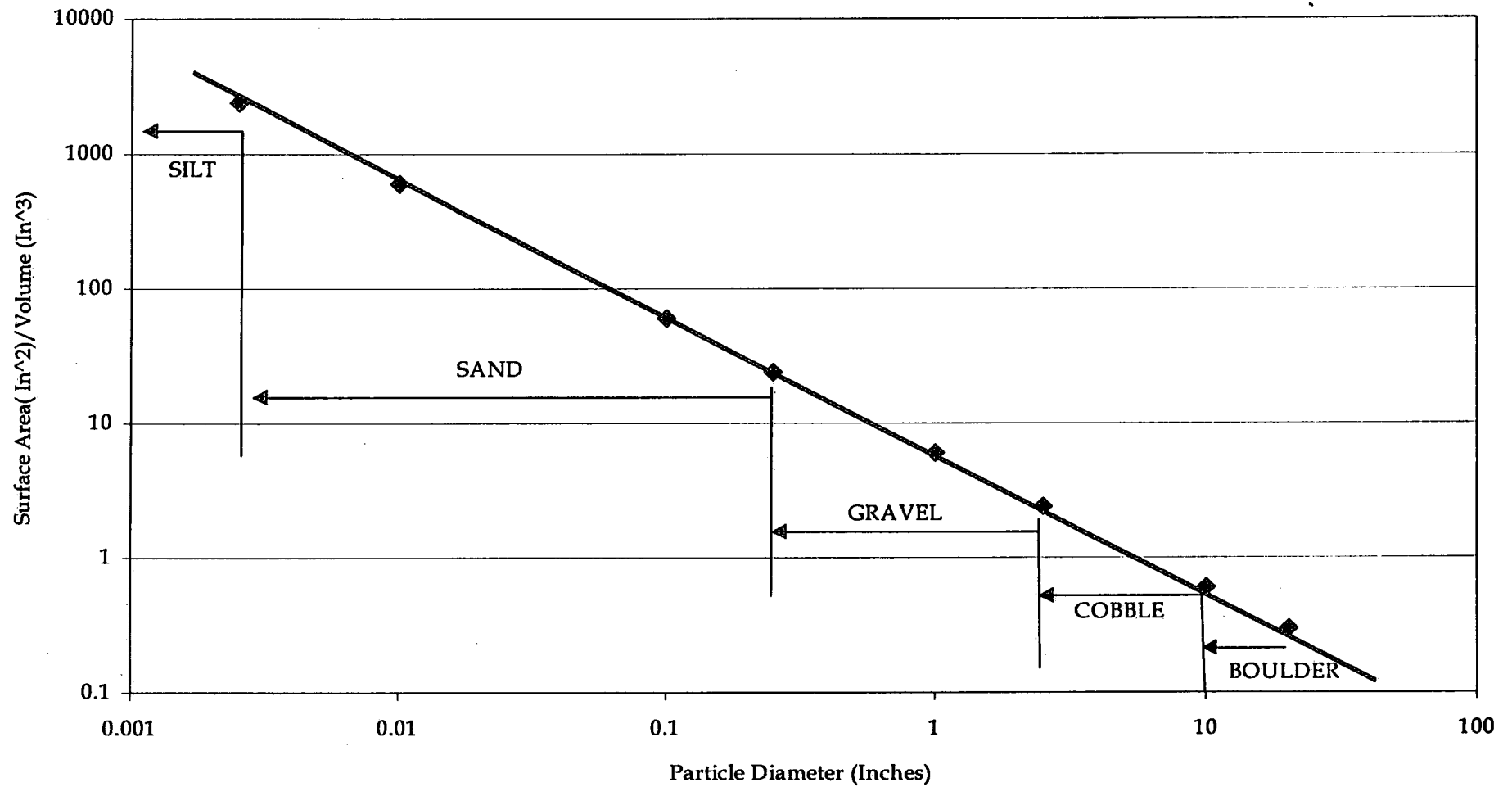


Illustration B
Surface Area to Volume Calculation Sheet

Computation of Surface Area To Volume Relationship

Diameter (Inches)	Surface Area (Sq. Inches)	Volume (Cubic Inches)	Volume/Surface Ratio	Surface Area/ Volume			
20	1256	4186.67	3.33	0.3			
10	314	523.33	1.67	0.6			
2.5	19.625	8.18	0.42	2.4			
1	3.14	0.52	0.17	6			
0.25	0.19625	0.01	0.04	24			
0.1	0.0314	0.00052	0.02	60			
0.01	0.000314	0.000001	0.00	600			
0.0025	1.96E-05	0.00000001	0.00	2400			

Type I Soil - Computation of Effective Particle Surface Area On To Which Free Product Would Be Retained

Particle Size Quartile (by percent weight)	Mean Diameter (Inches)	Mean Particle Area (Sq. Inches)	Mean Particle Volume (Cubic Inches)	Mean Volume /Surface Ratio	Mean Surface Area/ Volume	Total Parts of Surface Area (T)	Percent of Total Volume (by Weight) (T/Z)
1	7	153.86	179.50	1.17	0.857143		
2	5	78.5	65.42	0.83	1.2	2.057143	
	TOTAL PERCENT IN COARSE FRACTION TO REMAIN ON SITE						0.167785
3	0.25	0.19625	0.01	0.04	24		
4	0.005	0.0000785	0.0000001	0.00	1200	1224	
	TOTAL PERCENT- FRACTION TO BE REMOVED FROM SITE						99.83221
			Sum of Means of surface area (Z) =		1226.057		